

Fitting Models to Data



Nancy Norem Powell



Math Modeling

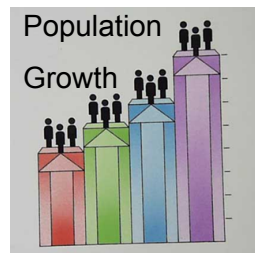
A basic premise of science is that much of the physical world can be described mathematically and that many physical phenomena are predictable.

This was part of the scientific revolution that took place in Europe during the late 1500's.



Skittles? Modeling?

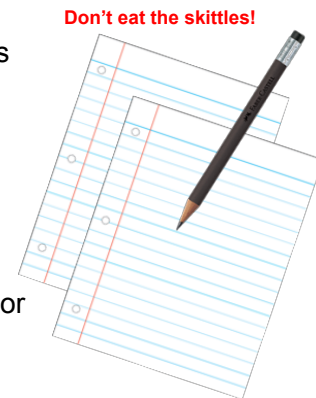
- Interestingly enough, we can simulate population with skittles.
- You're asking how?
- Let's do an experiment....



Equipment needed



Each group needs
2 paper plates
Cup of skittles
2 pieces of paper
Pencil
Graphing calculator





Let's get started

1. On one sheet of paper, Label it Population Growth and make two columns.

Trial #	# of skittles on the plate
0	1

2. Take out one skittle and put it on one of your paper plates – one side has an “S” on it and the other doesn’t. If your skittle does not have an “S” on it, put it back in the cup and find another one with an “S” on it.

Don't eat the skittles!



3. Place the other paper plate on top and GENTLY shake the plates.

4. Remove the top plate. If you see an “S” showing on the skittle, add 1 skittle. Record how many skittles are on your plate after you’ve finished your first trial.

5. Place the paper plate back on top and gently shake the plates with the skittles again.

Don't eat the skittles!



Don't eat the skittles!

6. Remove the top plate. Count how many “S” are showing. Add 1 skittle for each “S” showing. Record how many skittles are now on your plate.

7. Repeat this until all of your skittles are out of the cup.

8. If you run out of skittles to add to your plate, record the number of skittles that SHOULD have been there if you had enough.

Don't eat the skittles!



Do you want to eat the Skittles?

Follow these directions!

1. On your second sheet of paper, label it DECAY and make two more columns.

Trial #	# of skittles on your plate
1	(count the number on your plate and record it here!)

2. Put the 2nd paper plate on top and shake the skittles gently.

3. If the “S” is showing, take it off the plate and count them as you take them off. Record how many skittles are LEFT ON THE PLATE!



Okay...

4. Divide the skittles that you took off the plate between your group members and **EAT** them.
5. Again, put the 2nd paper plate on top and shake the skittles GENTLY.
6. If the "S" is showing, **continue taking them off the plate**, record how many skittles are **LEFT ON THE PLATE** and eat the skittles!



Find a model

- When you have **one skittle left** or you take your last skittle off the plate, stop.
- Now it's time to **fit models to your data**.
- Each of you should take a set of data and create a Scatterplot. You may need to review the graphs of basic functions to identify the shape of your models' function.
- Find a model for each experiment – one for **Population Growth** and one for **Decay**.



Was this a Sweet Experiment or What?

- Post your models on the board when you find them.
- Be prepared to explain what the equation is telling you! What is each number telling you about your experiment?



Picture from

<http://snackanalysis.blogspot.com/2012/07/skittles.html>

Scatterplot instructions available at:

<http://greenapples.wikispaces.com/Graphing+Calculator+Help>